

WIKIPEDIA

# Coffret Corsi-Rosenthal

La **boîte Corsi-Rosenthal** , également appelée **cube Corsi-Rosenthal** ou **cube Comparetto** , est une conception pour un purificateur d'air à faire soi-même qui peut être construit à un prix relativement bas. Il a été conçu pendant la pandémie de COVID-19 dans le but de réduire les niveaux de particules virales en suspension dans l'air dans les environnements intérieurs.



Un exemple d'unité de filtration d'air Corsi-Rosenthal Box maison

## Contenu

**Contexte et histoire**

**Concevoir**

**Efficacité**

**Les références**

## Contexte et histoire

Depuis que COVID-19 a été déclaré pandémie par l' Organisation mondiale de la santé le 11 mars 2020, <sup>[1]</sup> des preuves, y compris des quantités croissantes de recherches évaluées par des pairs , se sont accumulées que le coronavirus 2 du syndrome respiratoire aigu sévère (SRAS-CoV-2), le virus à l'origine du COVID-19, est en suspension dans l'air. <sup>[2]</sup> <sup>[3]</sup> <sup>[4]</sup> Les événements de super-propagation sont généralement associés à des rassemblements à l'intérieur. <sup>[5]</sup> <sup>[6]</sup> En réponse aux preuves émergentes et aux recommandations des chercheurs en maladies infectieuses, <sup>[7]</sup> <sup>[8]</sup> les ingénieurs ont commencé à examiner comment une meilleure ventilation peut réduire recharges virales . <sup>[9]</sup>

Les unités de purification d'air avec filtration HEPA peuvent être coûteuses, souvent bien au-delà de 500 USD . <sup>[10]</sup> <sup>[9]</sup> <sup>[11]</sup> En août 2020, Richard Corsi , ingénieur en environnement et nouveau doyen d'ingénierie de l' Université de Californie, Davis , <sup>[12]</sup> a parlé avec le journaliste de *Wired* Adam Rogers d'une idée qu'il avait de combiner plusieurs filtres achetés en magasin avec un ventilateur pour améliorer l'efficacité des conceptions de filtres à air faits maison. <sup>[9]</sup> Rogers a contacté Jim Rosenthal, PDG du fabricant de filtres Tex-Air Filters, qui avait collaboré avec Corsi à l' Université du Texas.et dans le chapitre texan de la Asthma and Allergy Foundation of America , pour effectuer des tests sur un seul filtre à air attaché à un ventilateur de boîtier. <sup>[13]</sup> Inspiré par l'idée de Corsi d'utiliser plusieurs filtres, Rosenthal a plus tard proposé un design à 5 filtres qu'il a nommé d'après Corsi, <sup>[13]</sup> bien qu'après qu'un article du New York Times ait mentionné les boîtes par leur nom, <sup>[11]</sup> Corsi a tweeté que Rosenthal a vraiment mérité le crédit, <sup>[14]</sup> et qu'il a préféré le nom Corsi-Rosenthal Box. <sup>[15]</sup> <sup>[16]</sup>

## Conception

The original Corsi-Rosenthal Box design consisted of five furnace filters, preferably of MERV13 or higher, which formed the sides and bottom of a cube.<sup>[13]</sup> A 20 inches (500 mm) box fan is placed on top and duct taped to the filters, sealing the system so that air is drawn through the filters, up and out of the box.<sup>[16]</sup><sup>[10]</sup> An updated design, also known as a Comparetto Cube,<sup>[17]</sup> uses four filters and a cardboard base that can sit directly on the floor.<sup>[18]</sup> Rosenthal later improved the design further by adding shrouds made of cardboard or similar materials to cover the corners of the box fan to improve efficiency and reduce backflow.<sup>[19]</sup><sup>[20]</sup>

The filtration units can be assembled in around fifteen minutes, last for months, and cost between US\$50 and \$150 in materials.<sup>[16]</sup><sup>[10]</sup><sup>[9]</sup>

## Efficacy

Airborne virus particulates range in size from 1 to 50 microns (µm). Rosenthal used his HVAC company's testing equipment to run an informal test of the design, in which he found that around 60% of 1 µm particles were removed by the system, and almost 90% of 10 µm particles were removed.<sup>[9]</sup> Clean air delivery rates (CADR) of a US\$75 design were estimated at between 165 and 239 (depending on fan speed) in an August 2021 case study by UC Davis researchers.<sup>[19]</sup> In October 2021, Corsi told GBH News that "People are now reporting 600 cubic feet per minute (280 L/s) in clean air delivery rates. That's phenomenal. That's actually better than a lot of the more expensive HEPA-based portable air cleaners".<sup>[10]</sup>

A study of a home-built air purifier to remove wildfire smoke, using a box fan and filter mounted in a window, showed that particulate matter between 1 and 10 µm in size was reduced by about 75%. *Wired* wrote that this study may be suggestive of the efficacy of similar filters to filter virus particles similar in size to the particles studied.<sup>[9][21]</sup>

## References

- Cucinotta, Domenico; Vanelli, Maurizio (19 March 2020). "WHO Declares COVID-19 a Pandemic" (<https://doi.org/10.23750/abm.v91i1.9397>). *Acta Bio Medica Atenei Parmensis*. **91** (1): 157–160. doi:10.23750/abm.v91i1.9397 (<https://doi.org/10.23750%2Fabm.v91i1.9397>). PMC 7569573 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7569573>). PMID 32191675 (<https://pubmed.ncbi.nlm.nih.gov/32191675>).
- Morawska, Lidia; Cao, Junji (June 2020). "Airborne transmission of SARS-CoV-2: The world should face the reality" (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7151430>). *Environment International*. **139**: 105730. doi:10.1016/j.envint.2020.105730 (<https://doi.org/10.1016%2Fj.envint.2020.105730>). PMC 7151430 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7151430>). PMID 32294574 (<https://pubmed.ncbi.nlm.nih.gov/32294574>).
- Morawska, Lidia; Milton, Donald K (6 July 2020). "It Is Time to Address Airborne Transmission of Coronavirus Disease 2019 (COVID-19)" (<https://doi.org/10.1093/cid/ciaa939>). *Clinical Infectious Diseases*. **71** (9): 2311–2313. doi:10.1093/cid/ciaa939 (<https://doi.org/10.1093%2Fcid%2Fciaa939>). ISSN 1058-4838 (<https://www.worldcat.org/issn/1058-4838>). PMC 7454469 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7454469>). PMID 32628269 (<https://pubmed.ncbi.nlm.nih.gov/32628269>).
- Zhang, Renyi; Li, Yixin; Zhang, Annie L.; Wang, Yuan; Molina, Mario J. (30 June 2020). "Identifying airborne transmission as the dominant route for the spread of COVID-19" (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7334447>). *Proceedings of the National Academy of Sciences*. **117** (26): 14857–14863. doi:10.1073/pnas.2009637117 (<https://doi.org/10.1073%2Fpnas.2009637117>). ISSN 0027-8424 (<https://www.worldcat.org/issn/0027-8424>). PMC 7334447 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7334447>). PMID 32527856 (<https://pubmed.ncbi.nlm.nih.gov/32527856>).
- Wainer, Gabriel. "How to prevent COVID-19 'superspreader' events indoors this winter" (<https://theconversation.com/how-to-prevent-covid-19-superspreader-events-indoors-this-winter-147439>). *The Conversation*. Retrieved 9 October 2021.
- Lewis, Dyani (23 February 2021). "Superspreading drives the COVID pandemic — and could help to tame it" (<https://www.nature.com/articles/d41586-021-00460-x>). *Nature*. **590** (7847): 544–546. Bibcode:2021Natur.590..544L (<https://ui.adsabs.harvard.edu/abs/2021Natur.590..544L>). doi:10.1038/d41586-021-00460-x (<https://doi.org/10.1038%2Fd41586-021-00460-x>). PMID 33623168 (<https://pubmed.ncbi.nlm.nih.gov/33623168>). S2CID 232037743 (<https://api.semanticscholar.org/CorpusID:232037743>).
- Noorimotlagh, Zahra; Jaafarzadeh, Neemat; Martínez, Susana Silva; Mirzaee, Seyyed Abbas (February 2021). "A systematic review of possible airborne transmission of the COVID-19 virus (SARS-CoV-2) in the indoor air environment" (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7726526>). *Environmental Research*. **193**: 110612. Bibcode:2021ER....193k0612N (<https://ui.adsabs.harvard.edu/abs/2021ER....193k0612N>). doi:10.1016/j.envres.2020.110612 (<https://doi.org/10.1016%2Fj.envres.2020.110612>). PMC 7726526 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7726526>). PMID 33309820 (<https://pubmed.ncbi.nlm.nih.gov/33309820>).

8. Greenhalgh, Trisha; Jimenez, Jose L; Prather, Kimberly A; Tufekci, Zeynep; Fisman, David; Schooley, Robert (May 2021). "Ten scientific reasons in support of airborne transmission of SARS-CoV-2" ([https://doi.org/10.1016/S0140-6736\(21\)00869-2](https://doi.org/10.1016/S0140-6736(21)00869-2)). *The Lancet*. **397** (10285): 1603–1605. doi:10.1016/s0140-6736(21)00869-2 (<https://doi.org/10.1016%2Fs0140-6736%2821%2900869-2>). ISSN 0140-6736 (<https://www.worldcat.org/issn/0140-6736>). PMC 8049599 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8049599>). PMID 33865497 (<https://pubmed.ncbi.nlm.nih.gov/33865497>).
9. Rogers, Adam (6 August 2020). "Could a Janky, Jury-Rigged Air Purifier Help Fight Covid-19?" (<https://www.wired.com/story/could-a-janky-jury-rigged-air-purifier-help-fight-covid-19/>). *Wired*. ISSN 1059-1028 (<https://www.worldcat.org/issn/1059-1028>). Retrieved 9 October 2021.
10. Emanuel, Gabrielle (17 August 2021). "DIY: How To Build A Cheap, Effective Classroom Air Filter" (<https://www.wgbh.org/news/local-news/2021/08/17/diy-air-filters-for-classrooms-experts-are-enthusiastic-and-a-citizen-scientist-makes-it-easy>). *WGBH*. Retrieved 9 October 2021.
11. Mandavilli, Apoorva (7 October 2020). "The plexiglass barriers at tonight's debate will be pretty useless, virus experts say" (<https://www.nytimes.com/2020/10/07/us/politics/the-plexiglass-barriers-at-tonights-debate-will-be-pretty-useless-virus-experts-say.html>). *The New York Times*. Retrieved 13 November 2021.
12. Bartl, Aditi Risbud (2 July 2021). "Richard Corsi Appointed College of Engineering Dean" (<https://engineering.ucdavis.edu/news/richard-corsi-appointed-college-engineering-dean>). *College of Engineering*. Retrieved 9 October 2021.
13. Rosenthal, Jim (22 August 2020). "A Variation on the "Box Fan with MERV 13 Filter" Air Cleaner" (<https://www.texairfilters.com/a-variation-on-the-box-fan-with-merv-13-filter-air-cleaner/>). *Tex-Air Filters*. Retrieved 13 November 2021.
14. @CorsiIAQ (7 October 2020). "Thanks for the shout out, @Don\_Milton. Great article. One correction. I mentioned the concept of a portable air cleaner with walls made of filters in an interview. But it was actually @JimRosenthal4 who built a unit shortly thereafter & deserves credit (gr8 craftsmanship!)" (<https://twitter.com/CorsiIAQ/status/1313887307477348353>) (Tweet) – via Twitter.
15. @CorsiIAQ (8 October 2020). "I am good with that! Thanks for this, Don" (<https://twitter.com/CorsiIAQ/status/1314100156137009152>) (Tweet) – via Twitter.
16. Lapook, Jon (7 October 2021). "New air purifiers filter at least 90% of COVID-carrying particles, researchers say" (<https://www.cbsnews.com/news/covid-air-purifiers-particles/>). *CBS News*. Retrieved 9 October 2021.
17. Trethewey, Ross (17 January 2021). "How to Make a DIY Air Filter" (<https://www.thisoldhouse.com/green-home/22231148/diy-air-filter>). *This Old House*. Retrieved 13 November 2021.
18. Rosenthal, Jim (4 July 2021). "IAQ Research-Practice in Action: The Corsi/Rosenthal Box Air Cleaner" (<https://www.texairfilters.com/iaq-research-practice-in-action-the-corsi-rosenthal-box-air-cleaner/>). *Tex-Air Filters*. Retrieved 13 November 2021.
19. Pistochini, Theresa; McMurry, Robert (August 2021). *Testing Different Configurations of Do-it-yourself Portable Air Cleaners* ([https://energy.ucdavis.edu/wp-content/uploads/Case-Study\\_DIY-Portable-Air-Cleaners-083121.pdf](https://energy.ucdavis.edu/wp-content/uploads/Case-Study_DIY-Portable-Air-Cleaners-083121.pdf)) (PDF) (Report). Retrieved 9 October 2021.
20. Rosenthal, Jim (4 November 2020). "How to Improve the Efficiency of the "Box Fan and MERV 13 Filter" Air Cleaner" (<https://www.texairfilters.com/how-to-improve-the-efficiency-of-the-box-fan-and-merv-13-filter-air-cleaner/>). *Tex-Air Filters*. Retrieved 13 November 2021.
21. Tham, KW ; Parshetti, GK ; Balasubramanian, R. ; Sekhar, C. ; Cheong, DKW (2018). « Atténuer l'exposition aux particules dans les bâtiments naturellement ventilés pendant les épisodes de brume » (<https://linkinghub.elsevier.com/retrieve/pii/S0360132317305498>) . *Bâtiment et environnement* . **128** : 96-106. doi : 10.1016/j.buildenv.2017.11.036 (<https://doi.org/10.1016%2Fj.buildenv.2017.11.036>) . (<https://linkinghub.elsevier.com/retrieve/pii/S0360132317305498>) (<https://doi.org/10.1016%2Fj.buildenv.2017.11.036>)

---

Retrieved from "[https://en.wikipedia.org/w/index.php?title=Corsi-Rosenthal\\_Box&oldid=1055058061](https://en.wikipedia.org/w/index.php?title=Corsi-Rosenthal_Box&oldid=1055058061)"

---

**Cette page a été modifiée pour la dernière fois le 13 novembre 2021, à 16:22 (UTC) .**

Le texte est disponible sous la licence Creative Commons Attribution-ShareAlike ; des conditions supplémentaires peuvent s'appliquer. En utilisant ce site, vous acceptez les Conditions d'utilisation et la Politique de confidentialité . Wikipedia® est une marque déposée de la Wikimedia Foundation, Inc. , une organisation à but non lucratif.